Catalogue of American Amphibians and Reptiles.

Ashton, Ray E. Jr. 1990. *Necturus lewisi.*

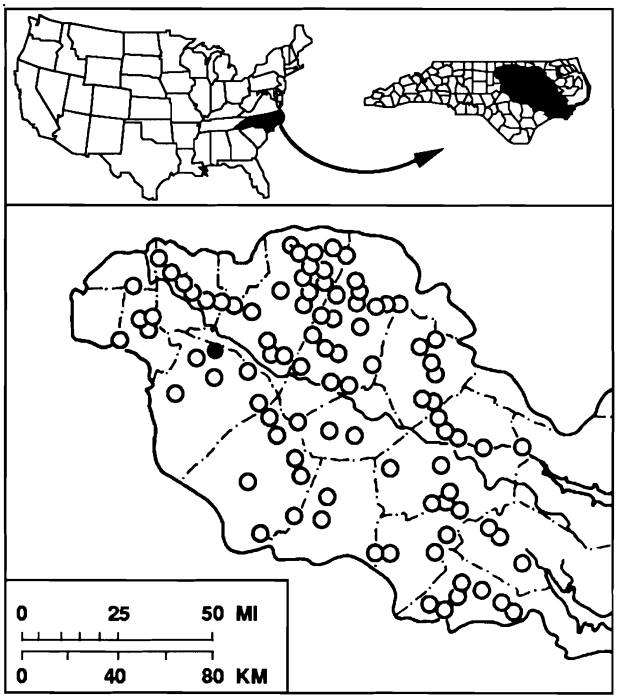
Necturus lewisi Brimley
Nuese River Waterdog

Necturus maculosus lewisi Brimley, 1924:167. Type-locality, "Nuese River, near Raleigh," Wake Co., North Carolina. Holotype, U. S. Nat. Mus. 73848, adult female collected by Frank B. Lewis, 25 Feb. 1921 (examined by author)
Necturus lewisi: Viosca, 1937:120.

• **Content.** *Necturus lewisi* is a monotypic species.

• **Definition.** Adults range from 90 to 173 mm in snout-vent length with females being slightly larger than males. The body is truncate and somewhat flattened dorsally. There are 14 costal grooves. The head and the snout are somewhat depressed and squared off. The tail is keeled and makes up approximately 28 percent of the total length. The color is brown to red-brown above and below, though sides may be somewhat darker. Purplish-black spots, generally larger and fewer in number than those of *Necturus maculosus*, are scattered over the head, body and tail, and are usually smaller on the head. A dark line from the snout passes through the eye, ending just anterior to the gills. The upper teeth are in two V-shaped series. The 10-12 premaxillary teeth form two divergent series paralleled by 9-12 vomerine teeth. There are 5-7 pterygoid teeth. Juveniles: Recently hatched larvae, approximately 28 mm in total length, are uniform light brown above and cream white ventrally. There is a white patch just behind and slightly larger than the eye. The tail keel is clear and the musculature is light brown. In post-hatching larvae, 21-41 mm snout-vent length, a broad, light tan dorsal stripe edges the costal grooves and extends from the snout on to the dorsum of the tail. Dark lateral stripes are continuous from the nostrils through the eye and labial region to the tail, where it widens. There is a spattering of unpigmented areas throughout this region. Legs are tan with a reticulated dark pattern. The underside is white and unspotted.

• **Descriptions.** Detailed descriptions of adults are given in Brimley (1939), Bishop (1926, 1943), Cahn and Shumway (1926), Viosca (1937), and Hecht (1953, 1958). Larvae were erroneously described by Brimley (1924), Bishop (1926), and Cahn and Shumway (1926). The post-hatching larval state was described by Viosca (1937) and Ashton and Braswell (1979). Nests and hatchling larvae are described in Ashton and Braswell (1979).



Map. Solid circle represents the type-locality. Open circles represent other localities.

• **Illustrations.** Behler and King (1979) and Martof et al. (1980) provided color photographs of adults. Black and white photos are in Bishop (1943). Drawings of the hatchling and post-hatchling stages are in Ashton and Braswell (1979)

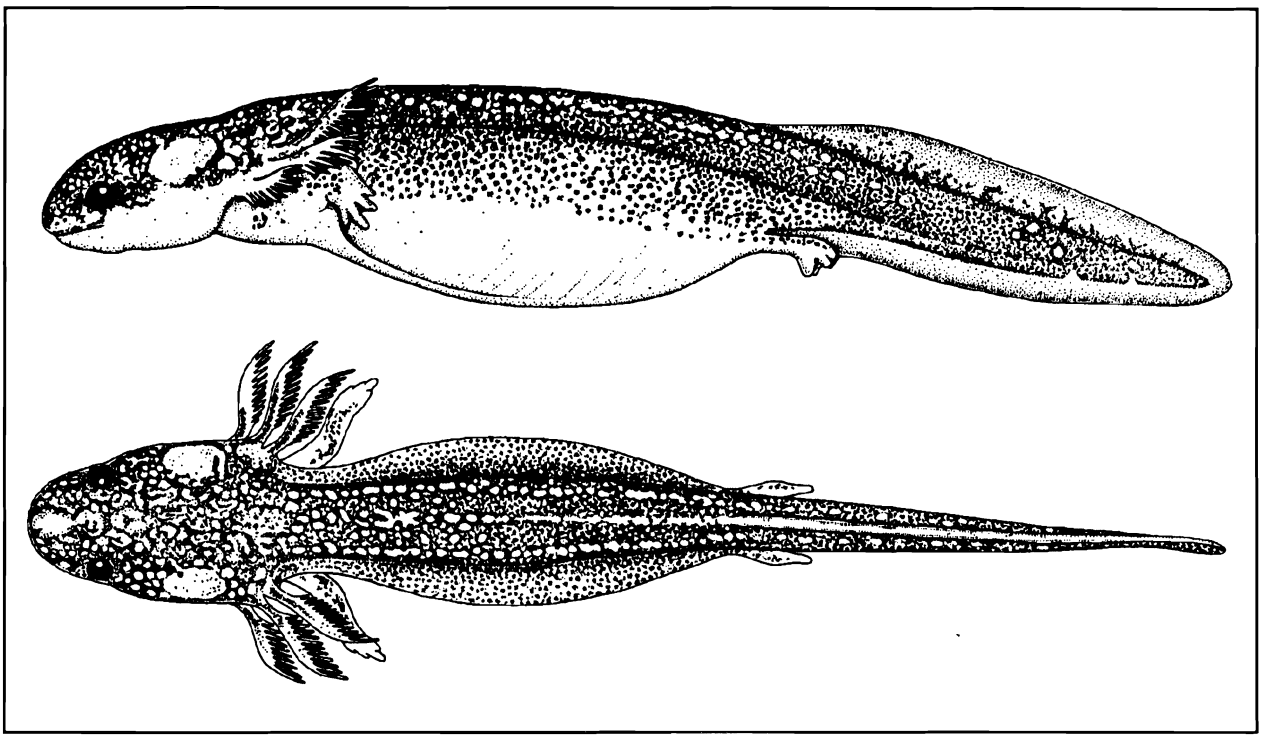


Figure 1. Hatchling *Necturus lewisi* (NCSM 19827, lot), from Ashton and Braswell (1979). Reproduced with permission.

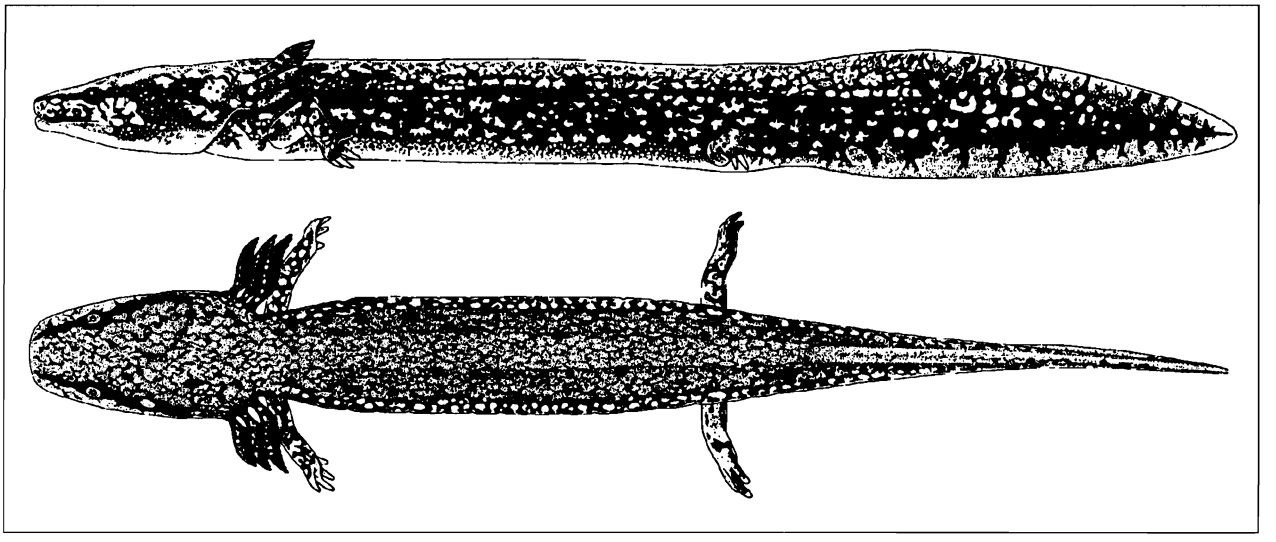


Figure 2. Post-hatchling (striped) larva of *Necturus lewisi* (NCSM 16555).

• **Distribution.** *Necturus lewisi* is endemic to the Tar and Neuse Rivers of the Piedmont and Coastal Plain of North Carolina. It is a stream form of proteid requiring relatively high oxygen levels and water quality. Details of distribution and habitat are in Ashton (1985) and in Braswell and Ashton (1985).

• **Fossil Record**. None.

• **Pertinent Literature.** A general historical review of research on *Necturus lewisi* is in Cooper and Ashton (1985). The ecology, feeding habits, intra- and interspecific interactions, courtship, movements, nesting habits, and other behavior were described by Fedak (1971), Ashton and Braswell (1979), Ashton (1985), and Braswell and Ashton (1985). Chromosomes (2n=38) and evolutionary relationships were illustrated and described by Sessions and Wiley (1985). Electrophoretic analysis and comparison with other *Necturus* were reported in Ashton et al. (1980). Pudney et al. (1985) described testis development and male reproductive cycles. Residues of pesticides and PCBs are reported in Hall et al. (1985). Brandon and Huheey (1985) gave results of studies on skin toxins.

• **Etymology.** The name *lewisi* honors Frank B. Lewis, collector of the type series.

• **Remarks.** Sessions and Wiley (1985), considered the karyotype of *Necturus lewisi* the most primitive in the genus.

Literature Cited

Ashton, Ray E. Jr. 1985. Field and laboratory observations on microhabitat selection, movements, and home range of *Necturus lewisi* (Brimley). Brimleyana (10):83-106.

——, and A. L. Braswell. 1979. Nest and larvae of the Nuese River Waterdog, *Necturus lewisi* (Brimely) (Amphibia: Proteidae). Brimleyana (1):15-22.

——, A. L. Braswell, and S. I. Guttman. 1980. Electrophoretic analysis of three species of *Necturus* (Amphibia: Proteidae), and the taxonomic status of *Necturus lewisi* (Brimley). Brimleyana (4): 43-46.

Behler, John L., and F. W. King. 1979. The Audubon Society field guide to the North American reptiles and amphibians. Alfred A. Knopf, New York. 719 p.

Bishop, Sherman C. 1926. Notes on the habits and development of the mudpuppy. New York State Mus. Bull. 268:1-60.

——. 1943. Handbook of salamanders. Comstock Publ. Co., Ithaca, New York. 555 p.

Brandon, Ronald A., and J. E. Huheey. 1985. Salamander skin toxins, with special reference to *Necturus lewisi*. Brimleyana (10):75-82.

Braswell, Alvin L., and R. E. Ashton, Jr. 1985. Distribution, ecology, and feeding habits of *Necturus lewisi* (Brimley). Brimleyana (10):13-35.

Brimley, C. S. 1924. The waterdogs (*Necturus*) of North Carolina. J. Elisha Mitchell Sci. Soc. 40(3-4):166-168.

——. 1939. The amphibians and reptiles of North Carolina (part 1). Carolina Tips 2(1): 2 p. (unnumbered).

Cahn, A. R., and W. Shumway. 1926. Color variation in larvae of *Necturus maculosus*. Copeia (130):4-8.

Cooper, John E., and R. E. Ashton, Jr. 1985. The *Necturus lewisi* study: introduction, selected literature review, and comments on the hydrologic units and their faunas. Brimleyana (10):1-12.

Fedak, Michael A. 1971. A comparative study of the life histories of *Necturus lewisi* Brimley and *Necturus punctatus* Gibbes (Caudata: Proteidae) in North Carolina. Masters thesis, Duke Univ. Durham. 103 p.

Hall, Russell J., R. E. Ashton, Jr., and R. M. Prouty. 1985. Pesticide and PCB residues in the Neuse River waterdog, *Necturus lewisi*. Brimleyana (10):107-109.

Hecht, Max K. 1953. A review of the salamander genus *Necturus* Rafinesque. Ph.D. thesis, Cornell Univ. Ithaca. 248 p.

——. 1958. A synopsis of the mud puppies of eastern North America. Proc. Staten Island Inst. Arts Sci. 21(1):1-38.

Martof, Bernard S., W. M. Palmer, J. R. Bailey, J. R. Harrison III, and J. Dermid. 1980. Amphibians and reptiles of the Carolinas and Virignia. Univ. North Carolina Press, Chapel Hill. 264 p.

Pudney, Jeffery, J. A. Canick, and G. V. Callard. 1985. The testis and reproduction in male *Necturus*, with emphasis on *N. lewisi* (Brimley). Brimleyana (10):53-74.

Sessions, Stanley K., and J. E. Wiley. 1985. Chromosome evolution in salamanders of the genus *Necturus*. Brimleyana (10):37-52.

Viosca, Percy, Jr. 1937. A tentative revision of the genus *Necturus* with descriptions of three new species from the southern Gulf drainage area. Copeia (2):120-138.

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